

Alan D. Dorval II: “Chuck”

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I. Academic History

- Present* – **University of Utah, College of Engineering**, Salt Lake City, UT
 –Jul. 2019 Associate Chair for Research & Director of Graduate Studies, Biomedical Engineering
 –Jul. 2016 Associate Professor in Department of Biomedical Engineering & Program in Neurosciences
 Jun. 2016 – Assistant Professor in the Department of Bioengineering and the Program in Neurosciences
 –Jan. 2009 Supported by the Biomedical Device Innovation Cluster of the USTAR Initiative.
 Research focuses on using engineering approaches to understand the nervous system and utilizing that knowledge to improve neural function and quality of life for individuals with neurological diseases and disorders.
 Methods include: multi-electrode recording in awake and behaving rodent models with electrical and optical tissue stimulation; silicon probe design; real-time control systems; in vitro recording of neurons and small neuronal networks; neuronal plasticity; information-theoretic analysis; and clinical studies of deep brain stimulation.
- Dec. 2008 – **Duke University, Pratt College of Engineering**, Durham, NC
 –Sept. 2004 Research Associate in Biomedical Engineering with Dr. Warren M. Grill.
 Research focused on Deep Brain Stimulation, a treatment for movement disorders.
 Methods include: computational modeling of affected brain regions; multi-electrode recording in a rodent model of movement disorder; information-theoretic signal analysis of data from
- Aug. 2001 **Marine Biological Laboratories**, Woods Hole, MA
 Completed Methods in Computational Neuroscience course. Co-directors: Dr. William Bialek and Dr. Robert de Ruyter van Stevenick.
 Explored the application of information theory approaches to experimental and computational neuroscience at all levels, from ion channel fluctuations to organism behavior.
- May 1997 – **Rensselaer Polytechnic Institute, College of Engineering**, Troy, NY
 Jan. 1995 Received B.S. in Biomedical Engineering with a concentration in Electrical Engineering.
 Focused on cellular biology, organic chemistry, physiology, analog & digital circuits, dynamical systems, embedded control and image processing. Completed senior project: software program to identify and localize brain activity in fMRI data.
- Sept. 1994 – **United States Naval Academy**, Annapolis, MD
 –Jul. 1992 Pursued studies in Electrical Engineering and Computer Science.
 Primary classes included calculus, physics, electronics, computer programming, leadership, naval & American history, and naval navigation, tactics & strategies.

II. Teaching Experience**Courses Directed**

- University of Utah, College of Engineering**, Salt Lake City, UT
- 2024 – 2016 Course Professor: Biological Statistical Signal Processing, graduate course. (5 terms)
 2023 Course Professor: Cellular Electrophysiology & Biophysics, graduate course. (1 term)
 2023 – 2011 Course Professor: Computational Neuroscience, graduate course. (7 terms)
 2023 – 2009 Section Professor: Biomedical Engineering Senior Projects, undergraduate course. (5 terms)
 2022 – 2011 Course Professor: BioSystems Analysis, undergraduate course. (12 terms)
 2015 – 2011 Course Professor: Neural Engineering Research Group, graduate course. (8 terms)

2014 – 2012 Course Professor: Computational Methods, undergraduate course. (2 terms)
 2013 – 2011 Course Professor: BioInstrumentation, graduate course. (3 terms)

Courses Assisted

University of Utah, College of Engineering, Salt Lake City, UT

2024 – 2023 Course Lecturer: Neural Systems, graduate course (~3 lecs/term, 2 terms)
 2022 – 2016 Course Lecturer: Neuroanatomy, graduate course (~2 lecs/term, 6 terms)
 2021 – 2015 Course Lecturer: Cellular Electrophys & Biophysic, graduate course (~4 lecs/term, 4 terms)

Marine Biological Laboratories, Woods Hole, MA

2004 Teaching Assistant: Neural Systems and Behavior, postdoctoral course.
 2003 Teaching Assistant: Methods in Computational Neuroscience, postdoctoral course.

Boston University, College of Engineering, Boston, MA

2002 – 1998 Teaching Fellow: Quantitative Studies of Excitable Membranes, graduate course. (3 terms)
 2000 Teaching Fellow: Advanced Signals and Systems, graduate course.
 1999 Teaching Fellow: Biomedical Instrumentation, graduate course.
 1998 Teaching Fellow: Quantitative Studies Cardiovascular & Respiratory Systems, graduate course.

Rensselaer Polytechnic Institute, College of Engineering, Troy, NY

1997 Teaching Assistant: Physics I, undergraduate course.

III. Related Experience

Sept. 1996 – **AutoQuant Imaging, Inc., Troy, NY**
 Aug. 1997 Software Engineer and Researcher.
 Lead creation team of fMRI activation analysis suite AutoDetect and analyzed fMRI data.
 Implemented various novel visualization and reconstruction algorithms for three-dimensional medical visualization software, AutoVisualize.
 Assisted in programming of a blind deconvolution software package, used for microscope data reconstruction, AutoDeblur.

IV. Research Support

Overcoming the Barriers to Effective Transcranial Temporal Interference Stimulation in Humans.

<i>Award ID:</i> NIH R01-NS133229	<i>PI:</i> Sumientra Rampersad	<i>Role:</i> Local-PI
<i>Period:</i> Jul. 2023 – Jun. 2028	<i>Total:</i> \$2,948,548	<i>Direct:</i> \$940,000

The project will develop transcranial temporal interference electrical stimulation into a realizable neuromodulatory intervention. In this project, we will determine stimulation parameters for robust modulation of deep brain circuits, validate that temporal interference modulation of neural activity in humans is caused by the beat field and not the carrier frequency, and develop efficient models to optimize the application of this technology to any brain target.

Manipulating Plasticity to Enable Brain-Computer Interface Learning.

<i>Award ID:</i> NSF CAREER 1351112	<i>PI:</i> Alan D. Dorval	<i>Role:</i> PI
<i>Period:</i> May 2014 – Apr. 2019	<i>Total:</i> \$456,000	<i>Direct:</i> \$308,014

The project objective is to determine if plasticity in the basal ganglia-thalamo-cortical loop can be co-opted to teach the brain to generate large, easily-detected, neural-field activity that could then be used to drive BCI devices. This project will utilize a naïve rat model of motor learning. In addition, this project will introduce novel invertebrate neural-computer interface systems to undergraduates in a biosystems analysis course.

Real-Time Experimental Interface.

<i>Award ID:</i> NIH/NIBIB R01-EB016407	<i>PI:</i> David Chrisitini	<i>Role:</i> Local-PI
<i>Period:</i> Aug. 2013 – Jul. 2018	<i>Total:</i> \$3,200,000	<i>Direct:</i> \$445,000

The project objective is to sustain and provide support for the open source, real-time electrophysiological control package, the Real-Time eXperimental Interface (RTXI). Our portion of the award is specifically targeted to generate novel real-time control modules to interface with animal nervous systems in vivo.

Implantable Particle-Based Wireless Probes for Minimally-Intrusive 3D Mapping of Brain Signals.*Award ID:* NSF EAGER 10039308*PI:* Carlos Mastrangelo*Role:* Co-PI*Period:* Aug. 2015 – Jul. 2017*Total:* \$299,998*Direct:* \$28,502

The project objective is to design, build, and test in vivo, wireless neural recording probes. The spherical probes will be ~1.0 mm in diameter, and include 8-16 recording channels per probe. Up to two implanted particles will transmit data to a transmitting recording system implanted subcutaneously under the scalp.

Pre-Clinical Studies in Novel Neural Interfacing Systems.*Award ID:* Blackrock Microsystems, Inc.*PI:* Alan D. Dorval*Role:* PI*Period:* Jul. 2014 – Jun. 2016*Total:* \$2,400*Direct:* \$2,400

The project objective is to test multi-electrode recording and stimulating arrays in a rat model. Arrays will be implanted and recorded from over 1 month post implantation. The goals of this work is to verify the acute and chronic durability of the new arrays, and to quantify their recording statistics across days and weeks.

Manipulating Neural Plasticity to Enable Robust Brain-Machine Interfaces.*Award ID:* Utah V.P. Research*PI:* Alan D. Dorval*Role:* PI*Period:* Jul. 2013 – Jun. 2014*Total:* \$28,000*Direct:* \$28,000

The project objective is to determine specific dual stimulation protocols to co-opt intrinsic motor learning mechanisms to teach the brain to amplify existing unit activity into structurally robust field events that could be detected reliably for decades.

DBS 10k: Silicon Electrode Arrays to Steer Charge in Deep Brain Structures.*Award ID:* Utah TCIP*PI:* Alan D. Dorval*Role:* PI*Period:* Mar. 2013 – Feb. 2014*Total:* \$40,000*Direct:* \$40,000

The project objective is to develop a cross-shaped DBS electrode with thousands of contacts, that will enable complete control over the electric field shape, size, and direction, to fit any particular region of the brain that requires stimulation, without driving adjacent tissue.

Time Course of Cortical Beta & Behavioral Efficacy in Response to STN DBS in an Animal Model of PD.*Award ID:* Medtronic Inc.*PI:* Alan D. Dorval*Role:* PI*Period:* Sept. 2012 – Feb. 2014*Total:* \$88,203*Direct:* \$58,999

The project objective is to determine how the time course of the cortical beta oscillations are modified by behaviorally effective versus behaviorally ineffective deep brain stimulation aimed to alleviate motor symptoms of parkinsonism in a rodent model. Our role is to perform all of the animal studies and data analyses.

Effects of Normal Aging on Neural Recording Device Performance in Chronic Applications.*Award ID:* DARPA, N66001-11-1-4120*PI:* Patrick Tresco*Role:* Co-PI*Period:* Jun. 2011 – Dec. 2012*Total:* \$629,675*Direct:* \$134,223

The project objective is to determine how the time course of the immune response to neural implants in adult neural tissue correlates with the degradation of recording ability from those implants. Our role is to perform and analyze the multi-electrode recordings, in adult and elderly rats, to assess the loss of recording ability over time.

Charge Steering, High Density, Deep Brain Stimulating (DBS) Electrode Arrays.*Award ID:* Utah TCIP*PI:* Alan D. Dorval*Role:* PI*Period:* Sept. 2011 – Nov. 2012*Total:* \$40,000*Direct:* \$40,000

The project objective is to develop a cross-shaped DBS electrode with thousands of contacts, that will enable complete control over the electric field shape, size, and direction, to fit any particular region of the brain that requires stimulation, without driving adjacent tissue.

Career Development in the Mechanisms of Deep Brain Stimulation.*Award ID:* NIH/NINDS, K25-NS053544*PI:* Alan D. Dorval*Role:* PI*Period:* Jan. 2006 – Dec. 2011*Total:* \$561,000*Direct:* \$510,000

The project objective is to determine the mechanisms by which DBS alleviates symptoms of movement disorders and improve treatment. Methods: computational modeling of brain regions; electrode recording in rodent models; information-theoretic analysis of primate models; and intra- and post- operative measurements in human patients.

V. Mentees

Doctoral Advisees

Active Ph.D. Candidates

3. Diego Perez (2023 – present), Ph.D. candidate, Biomedical Engineering, U of Utah, SLC UT
2. Jeremi Godbout (2023 – present), Ph.D. candidate, Biomedical Engineering, U of Utah, SLC UT
1. Brian Philip (2022 – present), Ph.D. candidate, Biomedical Engineering, U of Utah, SLC UT

Past Ph.D. Graduates

6. Chantel Charlebois (2023 – 2017), Ph.D. 2023, Biomedical Engineering, University of Utah, SLC UT
5. Christian Polar (2021 – 2010), Ph.D. 2020, Biomedical Engineering, University of Utah, SLC UT
4. Daria Nesterovich (2019 – 2014), Ph.D. 2019, Biomedical Engineering, University of Utah, SLC UT
3. Katherine Lambert (2018 – 2013), Ph.D. 2018, Biomedical Engineering, University of Utah, SLC UT
2. Collin Anderson (2015 – 2009), Ph.D. 2016, Bioengineering, University of Utah, Salt Lake City UT
1. Andrew Willsie (2014 – 2009), Ph.D. 2015, Bioengineering, University of Utah, Salt Lake City UT

Masters Advisees

Active M.S. Candidates

2. Justin Campbell (2023 – present), M.S. candidate, Biomedical Engineering, University of Utah, SLC UT
1. Anna Jacobsen (2023 – present), M.S. candidate, Biomedical Engineering, University of Utah, SLC UT

Past M.S. Graduates

11. Kyle Adams (2023 – 2022), M.S. 2023, Biomedical Engineering, University of Utah, Salt Lake City UT
10. Howard Lakouagna (2021 – 2009), M.S. 2021, Biomedical Engineering, University of Utah, SLC UT
9. Chantel Charlebois (2020 – 2017), M.S. 2018, Biomedical Engineering, University of Utah, SLC UT
8. Heidi Febinger (2019 – 2015), M.Phil. 2019, Neuroscience, University of Utah, SLC UT
7. Robert Moesinger (2018 – 2016), M.S. 2018, Biomedical Engineering, University of Utah, SLC UT
6. Daria Anderson (2017 – 2014), M.S. 2017, Biomedical Engineering, University of Utah, SLC UT
5. Nikhita Lanka (2017 – 2016), M.S. 2017, Electrical Engineering, University of Utah, Salt Lake City UT
4. Katherine Lambert (2016 – 2013), M.S. 2016, Bioengineering, University of Utah, Salt Lake City UT
3. Eric Melonakos (2016 – 2014), M.S. 2015, Bioengineering, University of Utah, Salt Lake City UT
2. Sylvana Schister (2013 – 2011), M.S. 2013, Bioengineering, University of Utah, Salt Lake City UT
1. Sanjay Devnani (2011 – 2009), M.S. 2017, Electrical Engineering, University of Utah, Salt Lake City UT

Bachelors Advisees

Active B.S. Thesis Students

3. Giuliana Rezende (2023 – present), B.S. student, Biomedical Engineering, U of Utah, Salt Lake City, UT
2. Madison Lodico (2021 – present), B.S. student, Biomedical Engineering, U of Utah, Salt Lake City, UT
1. Patrick Brashear (2021 – present), B.S. student, Biomedical Engineering, U of Utah, Salt Lake City, UT

Past B.S. Thesis Graduates

15. James Craig (2023 – 2022), B.S. 2023, Biomedical Engineering, U of Utah, Salt Lake City, UT
14. Brekka Geyu Weng (2020 – 2018), B.S. 2020, Biomedical Engineering, University of Utah, SLC UT
13. Benjamin Heck (2020 – 2018), B.S. 2020, Biomedical Engineering, University of Utah, SLC UT
12. Megan Spehar (2019 – 2017), B.S. 2018, Biomedical Engineering, University of Utah, SLC UT
11. Connor Anderson (2019 – 2017), B.S. 2018, Biomedical Engineering, University of Utah, SLC UT
10. Rachel Huynh (2017 – 2014), B.S. 2017, Bioengineering, University of Utah, Salt Lake City UT
9. Elizabeth Einarson (2016 – 2014), B.S. 2017, Bioengineering, University of Utah, Salt Lake City UT
8. Kenneth Louie (2015 – 2012), B.S. 2015, Bioengineering, University of Utah, Salt Lake City UT
7. Stephen Adams (2013 – 2012), B.S. 2014, Bioengineering, University of Utah, Salt Lake City UT
6. Sahn Woo Park (2013 – 2010), B.S. 2013, Bioengineering, University of Utah, Salt Lake City UT
5. Nathaniel O. King (2013 – 2009), B.S. 2013, Bioengineering, University of Utah, Salt Lake City UT
4. Bryce Hayden (2013 – 2009), B.S. 2014, Bioengineering, University of Utah, Salt Lake City UT

3. Weston S. Thompson (2011 – 2009), B.S. 2011, Bioengineering, University of Utah, Salt Lake City UT
2. Madison Li (2008 – 2007), B.S. 2009, Biomedical Engineering, Duke University, Durham NC
1. Audrey Burke (2007 – 2006), B.S. 2007, Biomedical Engineering, Duke University, Durham NC

Principal Investigator of Laboratory Research

Active Student Lab Members

1. Peyton Messina (2024 – present), B.S. student, Biomedical Engineering, University of Utah, SLC, UT

Past Student Lab Members

22. Ann Bigelow (2023 – 2022), B.S. student, Mathematics Major, BME Minor, U of Utah, SLC, UT
21. Claire Sanderson (2023 – 2022), B.S. student, Music, University of Utah, Salt Lake City, UT
20. Amanpreet Atwal (2022 – 2021), B.S. 2022, Biomedical Engineering, U of Utah, Salt Lake City, UT
19. Colin McNabb (2021 – 2020), B.S. 2021, Biomedical Engineering, U of Utah, Salt Lake City, UT
18. Arianna LaLonde (2019), B.S. 2022, Biomedical Engineering, University of Utah, SLC UT
17. Tom Odell (2019 – 2018), B.S. 2020, Chemistry, University of Utah, Salt Lake City UT
16. Mitch Morris (2018 – 2017), B.S. 2019, Business, University of Utah, Salt Lake City UT
15. Jennifer Nelson (2018 – 2017), B.S. 2019, Computer Science, University of Utah, Salt Lake City UT
14. Gabrielle Hoyer (2018 – 2014), B.S./M.S. 2018, Bioengineering, University of Utah, SLC UT
13. Fiona Weathersby (2017 – 2016), M.S. 2019, Biomedical Engineering, University of Utah, SLC UT
12. Christine Henry (2017 – 2016), B.S./M.S. 2019, Biomedical Engineering, University of Utah, SLC UT
11. Ryan Viertel (2014), Ph.D. 2018, Mathematics, University of Utah, Salt Lake City UT
10. Minna Wang (2014), B.S. 2016, Bioengineering, University of Utah, Salt Lake City UT
9. Daylan Sheppard (2015 – 2013), B.S. 2016, Chemistry, University of Utah, Salt Lake City UT
8. Chalise Carlson (2014), B.S. 2014, Psychology, University of Utah, Salt Lake City UT
7. J. Wesley Albright (2013 – 2012), B.S. 2013, Bioengineering, University of Utah, Salt Lake City UT
6. William R. Valdez (2011), B.S. 2014, Bioengineering, University of Utah, Salt Lake City UT
5. Nicholas Johnson (2011 – 2010), B.S. 2013, Bioengineering, University of Utah, Salt Lake City UT
4. Jordan D. Rich (2011 – 2010), B.S. 2014, Bioengineering, University of Utah, Salt Lake City UT
3. Lucia B. Irazabal (2011 – 2010), B.S. 2014, Bioengineering, Catholic University, Washington DC
2. Sanjay Devnani (2010 – 2009), M.S. 2011, Computer Science, University of Utah, Salt Lake City UT
1. Neil Panjwani (2009 – 2008), B.S. 2010, Biomedical Engineering, Duke University, Durham NC

Doctoral Committees

Active Ph.D. Committees

20. Tamanna Islam (2024 – present), Ph.D. candidate, Biomedical Engineering, U of Utah, SLC UT
19. Daniel Feldman (2023 – present), Ph.D. candidate, Biomedical Engineering, U of Utah, SLC UT
18. Abigail Harrison (2023 – present), Ph.D. candidate, Biomedical Engineering, U of Utah, SLC UT
17. Trey Blackwell (2022 – present), Ph.D. candidate, Biomedical Engineering, U of Utah, SLC UT
16. Lars Lofgren (2022 – present), Ph.D. candidate, Biomedical Engineering, U of Utah, SLC UT
15. Eric Paccione (2022 – present), Ph.D. candidate, Biomedical Engineering, U of Utah, SLC UT
14. Bram Hunt (2022 – present), Ph.D. candidate, Biomedical Engineering, U of Utah, SLC UT
13. Andrea Corbin (2022 – present), Ph.D. candidate, Biomedical Engineering, U of Utah, SLC UT
12. Anna Busatto (2022 – present), Ph.D. candidate, Biomedical Engineering, U of Utah, SLC UT
11. Phillip Comeaux (2021 – present), Ph.D. candidate, Biomedical Engineering, U of Utah, SLC UT
10. Troy Tully (2021 – present), Ph.D. candidate, Biomedical Engineering, U of Utah, SLC UT
9. Geyu Weng (2021 – present), Ph.D. candidate, Biomedical Engineering, U of Utah, SLC UT
8. Caleb Thompson (2021 – present), Ph.D. candidate, Biomedical Engineering, U of Utah, SLC UT
6. Lindsay Rupp (2020 – present), Ph.D. candidate, Biomedical Engineering, University of Utah, SLC UT
5. Rose Caston (2019 – present), M.D./Ph.D. candidate, Biomedical Engineering, U of U, SLC UT
4. Matthew Trone (2019 – present), Ph.D. candidate, Biomedical Engineering, University of Utah, SLC UT
3. Eugene Kwan (2019 – present), Ph.D. candidate, Biomedical Engineering, University of Utah, SLC UT
2. David Hilgart (2012 – present), Ph.D. candidate, Bioengineering, University of Utah, SLC UT
1. Micah Frerck (2011 – present), Ph.D. candidate, Bioengineering, University of Utah, Salt Lake City UT

Past Ph.D. Committees

46. Shwan Javdan (2024 – 2020), Ph.D. 2024, Biomedical Engineering, University of Utah, SLC UT
45. Kylee North (2023 – 2021), Ph.D. 2023, Biomedical Engineering, University of Utah, SLC UT
44. Jake Bergquist (2023 – 2019), Ph.D. 2023, Biomedical Engineering, University of Utah, SLC UT
43. William Mitch Thomas (2023 – 2018), Ph.D. 2023, Biomedical Engineering, University of Utah, SLC UT
42. Hunter Strathman (2023 – 2018), Ph.D. 2023, Biomedical Engineering, University of Utah, SLC UT
41. Tyler Page (2023 – 2017), Ph.D. 2023, Biomedical Engineering, University of Utah, SLC UT
40. Taylor Hansen (2022 – 2018), Ph.D. 2022, Biomedical Engineering, University of Utah, SLC UT
39. Michael Paskett (2021 – 2018), Ph.D. 2021, Biomedical Engineering, University of Utah, SLC UT
38. Stefan Niederauer (2021 – 2018), Ph.D. 2021, Biomedical Engineering, University of Utah, SLC UT
37. Shana Black (2021 – 2017), Ph.D. 2021, Biomedical Engineering, University of Utah, SLC UT
36. Anil Palaparthi (2021 – 2016), Ph.D. 2021, Biomedical Engineering, University of Utah, SLC UT
35. Patrick Kolbay (2021 – 2016), Ph.D. 2021 Biomedical Engineering, University of Utah, SLC UT
34. Anne Gibson (2021 – 2015), Ph.D. 2021, Neuroscience, University of Utah, Salt Lake City UT
33. Wilson Good (2020 – 2018), Ph.D. 2020, Biomedical Engineering, University of Utah, SLC UT
32. A. Tye Gardner (2020 – 2018), Ph.D. 2020, Electrical Engineering, University of Utah, SLC UT
31. Marta Iversen (2020 – 2017), Ph.D. 2020, Biomedical Engineering, University of Utah, SLC UT
30. Kara Johnson (2020 – 2017), Ph.D. 2020, Biomedical Engineering, University of Utah, SLC UT
29. Andrew Janson (2020 – 2016), Ph.D. 2020, Biomedical Engineering, University of Utah, SLC UT
28. Gordon Duffley (2020 – 2016), Ph.D. 2020, Biomedical Engineering, University of Utah, SLC UT
27. Joshua Stover (2019 – 2015), Ph.D. 2019, Biomedical Engineering, University of Utah, SLC UT
26. Mohit Sharma (2019 – 2015), Ph.D. 2019, Electrical & Computer Engineering, Univ. of Utah, SLC UT
25. Jacob Nieveen (2019 – 2014), Ph.D. 2019, Electrical & Computer Engineering, Univ. of Utah, SLC UT
24. Elyar Ghafoori (2019 – 2018), Ph.D. 2019, Biomedical Engineering, University of Utah, SLC UT
23. Marsa Taheri (2019 – 2018), Ph.D. 2019, Biomedical Engineering, University of Utah, Salt Lake City UT
22. Kyle Burk (2019 – 2016), Ph.D. 2019, Biomedical Engineering, University of Utah, Salt Lake City UT
21. Mohammad Sohail Noor (2018 – 2017), PhD, Biomed Engineering, U. Calgary, Calgary, Alberta Canada
20. Arad Lajevardi-Khosh (2018 – 2015), Ph.D. 2018, Biomedical Engineering, University of Utah, SLC UT
19. Katie Sciuto (2018 – 2015), Ph.D. 2018, Biomedical Engineering, University of Utah, SLC UT
18. David Kluger (2018 – 2013), Ph.D. 2018, Biomedical Eng., University of Utah, Salt Lake City UT
17. Feliks Furmanov (2018 – 2012), Ph.D. 2019, Neuroscience, University of Utah, Salt Lake City UT
16. Eric Melonakos (2017 – 2014), Ph.D. 2017, Bioengineering, University of Utah, Salt Lake City UT
15. Suzanne Wendelken (2017 – 2013), MD/PhD candidate, Bioengineering, University of Utah, SLC UT
14. Zack Kagan (2017 – 2013), Ph.D. 2017, Bioengineering, University of Utah, Salt Lake City UT
13. Nicholas Nolta (2015 – 2014), Ph.D. 2015, Bioengineering, University of Utah, Salt Lake City UT
12. Robert S. Oakes (2015 – 2014), Ph.D. 2015, Bioengineering, University of Utah, Salt Lake City UT
11. Sourav Kole (2015 – 2012), Ph.D. 2015, Bioengineering, University of Utah, Salt Lake City UT
10. Joan J. Martinez (2015 – 2011), Ph.D. 2015, Bioengineering, University of Utah, Salt Lake City UT
9. J. Michael Gee (2015 – 2011), Ph.D. 2015, Bioengineering, University of Utah, Salt Lake City UT
8. Andrew K. Haack (2015 – 2011), Ph.D. 2015, Neuroscience, University of Utah, Salt Lake City UT
7. Paul Venable (2014 – 2012), Ph.D. 2014, Bioengineering, University of Utah, Salt Lake City UT
6. Kyle Thomson (2014 – 2011), Ph.D. 2014, Bioengineering, University of Utah, Salt Lake City UT
5. Ross H. Booth (2014 – 2011), Ph.D. 2014, Bioengineering, University of Utah, Salt Lake City UT
4. Nicholas Roehner (2014 – 2011), Ph.D. 2014, Bioengineering, University of Utah, Salt Lake City UT
3. Sara Hanrahan (2013 – 2012), Ph.D. 2013, Bioengineering, University of Utah, Salt Lake City UT
2. Andrea Schwager (2013 – 2010), Ph.D. 2013, Neuroscience, University of Utah, Salt Lake City UT
1. Noah Ledbetter (2011 – 2009), Ph.D. 2011, Bioengineering, University of Utah, Salt Lake City UT

Masters CommitteesActive M.S. Committees

3. Rachel Klink (2023 – present), M.S. candidate, Biomedical Engineering, University of Utah, SLC UT
2. Sonia Osuna (2023 – present), M.S. candidate, Biomedical Engineering, University of Utah, SLC UT
1. James Craig (2022 – present), M.S. candidate, Biomedical Engineering, University of Utah, SLC, UT

Past M.S. Committees

19. Joshua Jackson (2023 – 2023), M.S. 2023, Biomedical Engineering, University of Utah, SLC UT
18. Jared Zollinger (2023 – 2023), M.S. 2023, Biomedical Engineering, University of Utah, SLC UT
17. Michael Allee (2023 – 2022), M.S. 2023, Biomedical Engineering, University of Utah, SLC UT
16. Bret Mecham (2023 – 2022), M.S. 2023, Biomedical Engineering, University of Utah, SLC UT
15. Tyler Slater (2022 – 2021), M.S. 2022, Biomedical Engineering, University of Utah, SLC UT
14. Nidhi Soley (2022 – 2021), M.S. 2022, Biomedical Engineering, University of Utah, SLC UT
13. Spencer Peterson (2021 – 2020), MS 2021, Biomedical Engineering, University of Utah, SLC UT
12. Arjun Acharya (2021 – 2020), MS 2021, Biomedical Engineering, University of Utah, SLC UT
11. Gabrielle Hoyer (2020 – 2018), BS/MS 2019, Biomedical Engineering, University of Utah, SLC UT
10. Jason Huang (2019 – 2017), MS 2021, Biomedical Engineering, University of Utah, Salt Lake City UT
9. Dylan Blair (2019 – 2018), MS 2021, Biomedical Engineering, University of Utah, Salt Lake City UT
8. Samuel Colby (2019 – 2018), MS 2019, Biomedical Engineering, University of Utah, SLC UT
7. Tivon Semnani (2019 – 2018), BS/MS 2019, Biomedical Engineering, University of Utah, SLC UT
6. Shravan Parthasarathy (2019 – 2018), M.S. 2019, Biomedical Engineering, University of Utah, SLC UT
5. Fiona Weathersby (2018 – 2017), M.S. 2018, Biomedical Engineering, University of Utah, SLC UT
4. MacKenzie Nichols (2017 – 2016), M.S. 2017, Bioengineering, University of Utah, Salt Lake City UT
3. Marsa Taheri (2016 – 2014), M.S. 2017, Bioengineering, University of Utah, Salt Lake City UT
2. Rudy Wilcox (2015 – 2012), M.S. 2015, Bioengineering, University of Utah, Salt Lake City UT
1. Kristina Grim (2012 – 2011), M.S. 2012, Bioengineering, University of Utah, Salt Lake City UT

VI. Presentations***Invited National/International Talks***

- Invited Seminar, Neurological Disorders Summit, Los Angeles, CA. “Cortical-Subthalamic Beta-Frequency Signaling Supports Movement in Healthy, but Impairs Movement in Parkinsonian, Rats.” July 2019.
- Featured Seminar, Real-Time eXperimental Interface Conference, Atlanta, GA. “Closed-Loop Neuromodulation – exposing pitfall and promise with preclinical trials via RTXI.” May 2015.
- Keynote Seminar, Rocky Mountain Bioengineering Symposium, Salt Lake City, UT. “Improving Deep Brain Stimulation Therapy by Understanding Parkinsonian Neurophysiology.” Apr. 2015.
- Neuroscience Chalk Talks, Program in Neuroscience, Boston University, Boston MA. “Understanding and Improving Deep Brain Stimulation.” Oct. 2014.
- National Science Foundation Workshop, BioMedical Engineering Society Conference, San Antonio TX. “Neuromodulation for Neural Prostheses Control.” Oct. 2014.
- Parkinson's Disease Circuit Mechanisms Nanosymposium, Society for Neuroscience Conference, New Orleans LA. “Directed information in globus pallidus neurons decreases with increasing parkinsonian severity.” Oct. 2012.
- Design of Medical Devices Conference, Minneapolis MN. “Closed-Loop Deep Brain Stimulation to Suppress Beta Activity in Parkinson's Disease.” Apr. 2012.
- Physiology, Biophysics and Systems Biology Seminar Series, Weill Cornell Medical College, New York NY. “Quantifying and harnessing the electrophysiological mechanisms of deep-brain-stimulation-induced parkinsonian symptom relief.” Oct. 2011.
- Computational Neural Engineering Mini-Symposium, IEEE Engineering in Medicine and Biology Conference, Minneapolis MN. “Deep Brain Stimulation that Abolishes Parkinsonian Activity in Basal Ganglia Improves Thalamic Relay Fidelity in a Computational Circuit .” Sept. 2009.
- Department of Biomedical Engineering Graduate Seminar Series, Case Western Reserve University, Cleveland OH. “Deep brain stimulation alleviates motor symptoms of Parkinson's disease by regularizing neural activity.” Apr. 2008.
- Department of Biomedical Engineering Seminar Series, Tulane University, New Orleans LA. “Deep brain stimulation alleviates motor symptoms of Parkinson's disease by regularizing neural activity.” Mar 2008.
- Department of Bioengineering Seminar Series, University of Utah, Salt Lake City UT. “Deep brain stimulation alleviates motor symptoms of Parkinson's disease by regularizing neural activity.” Feb. 2008.

- Department of Biomedical Engineering Graduate Seminar Series, University of Minnesota, Minneapolis MN.
 “Deep brain stimulation alleviates motor symptoms of Parkinson's disease by regularizing neural activity.” Jan. 2008.
- NIH & NINDS Neural Interfaces Workshop, Student Presentations, Bethesda MD. “High frequency subthalamic stimulation restores order to pallidal firing patterns.” Sept. 2005.
- Department of Biomedical Engineering Graduate Seminar Series, Case Western Reserve University, Cleveland OH. “Probing the role of noise in the superficial medial entorhinal cortex.” Feb. 2004.

Selected National/International Conference Presentations

- Neuromodulation Session, Neural Engineering Track, BioMedical Engineering Society Conference, Virtual Meeting, “Parkinson’s Disease Suppresses Relationship Between Neural Beta Activity and Future Movement.” Oct. 2020.
- Neural Disease Session, Neural Engineering Track, BioMedical Engineering Society Conference, Minneapolis MN, “Deep brain stimulation reestablishes cortical beta power with gait speed in a parkinsonian rat model.” Oct. 2016.
- Neural Interfaces: Compatibility, Recording, and Stimulation Session, Neural Engineering Track, BioMedical Engineering Society Conference, Tampa FL, “Pallidal neural information increases with parkinsonian severity in a non-human primate model.” Oct. 2015.
- Deep Brain Stimulation Session, Neural Engineering Track, BioMedical Engineering Society Conference, Seattle WA, “Neural information in globus pallidus degrades with increasing parkinsonian severity.” Sept. 2013.
- Translational Neural Engineering Session, Neural Engineering Track, BioMedical Engineering Society Conference, Atlanta GA, “Deep brain stimulation restores information processing in a rodent model of parkinsonism.” Oct. 2012.
- Neural Modeling and Computing, Neural Engineering Track, IEEE Engineering in Medicine and Biology Conference, Minneapolis MN, “Deep Brain Stimulation that Abolishes Parkinsonian Activity in Basal Ganglia Improves Thalamic Relay Fidelity in a Computational Circuit.” Sept. 2009.
- Neural Engineering: Neuromodulation Session, Neural Engineering Track, BioMedical Engineering Society Conference, Los Angeles CA, “High frequency stimulation that regularizes thalamic activity treats parkinsonian bradykinesia.” Sept. 2007.
- Neural Stimulation and Modulation Session, Neural Engineering Track, BioMedical Engineering Society Conference, Chicago IL, “Pallidal neurons phase lock to deep brain stimulation in the subthalamic nucleus.” Oct. 2006.
- Neural Implants, Prosthetics, and Rehabilitation Session, Neural Engineering Track, BioMedical Engineering Society Conference, Baltimore MD, “Deep brain stimulation puts neural activity back in order.” *BioMedical Engineering Society, annual meeting*, Sept. 2005.
- Neural Interfaces with Electronics, Computers and Robots Session, Neural Engineering Track, BioMedical Engineering Society Conference, Philadelphia PA, “Intrinsic noise broadens the spectrum of expressible neuronal behaviors.” Oct. 2004.

University Community Seminars

- Current Research in Bioengineering, Department of Bioengineering, University of Utah, Dec. 2019.
 “Modulating Neural Activity & Alleviating Neurological Symptoms.”
- Advances in Bioengineering, Osher Life Long Learning, University of Utah, Feb. 2019. “Pacemakers for the Brain to Treat Neurological Symptoms.”
- Current Research in Bioengineering, Department of Bioengineering, University of Utah, Oct. 2018.
 “Electrical Stimulation of the Brain to Treat Neurological Disorders.”
- Neurology Grand Rounds, Department of Neurology, University of Utah, Oct. 2018. “Subtle Relationship between Cortical Beta Power and Parkinsonian Severity.”
- Current Research in Bioengineering, Department of Bioengineering, University of Utah, Nov. 2017.
 “Modulating Brain Activity to Improve Motor Function.”
- Current Research in Bioengineering, Department of Bioengineering, University of Utah, Feb. 2017.
 “Modulating Brain Activity to Alleviate Symptoms of Neurological Disorders.”

Current Research in Bioengineering, Department of Bioengineering, University of Utah, Feb. 2015. "Understanding and Improving Deep Brain Stimulation Therapy for Parkinson's Disease."

Frontiers in Neuroscience Seminar, Program in Neurosciences, University of Utah, Oct. 2015. "Neural Information Transmission and Therapeutic Deep Brain Stimulation."

Disturbance Recovery via Relict Structures Transdisciplinary Seminar Series, University of Utah, Dec. 2014. "Mechanisms of Neural System Recovery."

Biology Faculty Seminar, University of Utah, Sept. 2014. "Neuromodulation Therapy to Alleviate Neurological Disorders."

Mathematical Neuroscience Seminar, Department of Mathematics, University of Utah, Nov. 2012. "Information Processing in the Parkinsonian, Efferent Basal Ganglia."

Current Research in Bioengineering, Department of Bioengineering, University of Utah, Oct. 2012. "How Deep Brain Stimulation can Alleviate the Symptoms of Parkinson's Disease."

Neurology Grand Rounds, Department of Neurology, University of Utah, Feb. 2012. "The Mechanisms of Parkinsonian Symptom Relief via Deep Brain Stimulation."

Frontiers in Neuroscience Seminar, Program in Neurosciences, University of Utah, Nov. 2011. "Mechanisms of Deep Brain Stimulation for Parkinson's disease."

Mathematical Biology Seminar, Mathematics Department, University of Utah, Nov. 2011. "Unraveling the Paradox of Parkinsonian Symptom Relief via Deep Brain Stimulation."

Frontiers in Neuroscience Seminar, Program in Neurosciences, University of Utah, Oct. 2010. "Deep Brain Stimulation for Parkinson's disease."

University Electrophysiologists Meeting, Brain Institute, University of Utah, Nov. 2009. "Deep Brain Stimulation Minimizes Neuronal Disorder in Animal Models of Parkinsonism."

Department of Bioengineering Colloquium, University of Utah, Aug. 2009. "Understanding Deep Brain Stimulation."

Community Outreach Lectures

Monthly Seminar at the Bountiful Lions Club, Bountiful UT. Sept. 2010. "Neural Engineering at U of U."

Media Coverage

Popular Science Italy, 2015. "Stimolazione cerebrale profonda per il Parkinson: A tu per tu con Chuck Dorval." Dec 2015, pp 34-35.

Innovation Utah Blog, 2014. "Alan Chuck Dorval II: Thinking Through Parkinson's Disease."
<http://www.innovationutah.com/blog/alan-chuck-dorval-ii-thinking-through-parkinsons-disease/>

Innovation Utah Blog, 2012. "Meet a USTAR Investigator: Chuck Alan Dorval."
<http://www.innovationutah.com/blog/meet-ustar-investigator-chuck-alan-dorval/>

VII. Professional Activities

Memberships

Society for Neuroscience (SfN), Member, 2000 – *present*.

BioMedical Engineering Society (BMES), Member, 2003 – *present*.

IEEE Engineering Medicine & Biology Society (EMBS), Member, 2009 – *present*.

American Physiological Society (APS), Member, 2010 – 2016.

American Society for Engineering Education (ASEE), Member, 2010 – 2012.

New York Academy of Sciences (NYAS), Member, 2010 – 2012.

Service

Nation / World

ABET Program Evaluator, 2023 – *present*.

National Science Foundation, 2023 Review Panel, Confidential Panelist in January

BioMedical Engineering Society, 2022 Reviewer, Session Chair, Computational Neuroengineering

National Science Foundation, 2022 Review Panel, Confidential Panelist in January

BioMedical Engineering Society, 2021 Conference, Reviewer, Session Chair, Neural Engineering III

National Science Foundation, 2021 Review Panel, Confidential Panelist in January

Swiss National Science Foundation, 2019 Ad Hoc Reviewer

Engineering in Medicine and Biology Society (IEEE), 2019 Conference, Reviewer
French National Research Agency, 2016 Scientific Expert, Proposal Reviewer
National Science Foundation, 2016 Review Panel, Confidential Panelist in February
European Control Conference, 2016 Conference, Reviewer
Biomedical Engineering Society, 2015 Conference, Reviewer
National Science Foundation, 2015 Review Panel, Confidential Panelist in January
Neural Engineering Research (IEEE-NER), 2015 Conference, Reviewer
Michael J. Fox Foundation, 2014 Review Panel, Neuromodulation, Panelist
National Science Foundation, 2014 Review Panel, Confidential Panelist in April
BioMedical Engineering Society, 2013 Conference, Session Chair, Deep Brain Stimulation
Neural Engineering Research (IEEE-NER), 2013 Conference, Reviewer
Engineering in Medicine and Biology Society (IEEE), 2013 Conference, Reviewer
National Science Foundation, 2012 Review Panel, Confidential Panelist in November
Biomedical Engineering Society, 2012 Conference, Session Chair, Translational Neural Engineering
Neural Interfaces Conference, 2012, Organizing Committee Member
Neural Interfaces Conference, 2012, Session Chair, Eng. Developments in Deep Brain Stimulation
Engineering in Medicine and Biology Society (IEEE), 2009 Conference, Reviewer & Judge
National Postdoctoral Association, 2008 – 2009, Advocacy Committee & Meetings Committee

University / College

Credits & Admissions University Committee, U of Utah, 2017 — *present*; Chair, 2022 — *present*.
Diversity Committee, College of Engineering, University of Utah, 2022 — *present*.
Graduate Fellowship Committee, University of Utah, 2022 — *present*.
Academic Senate, College of Engineering Representative, University of Utah, 2016 – 2019.
College Council, College of Engineering, University of Utah, 2016 – 2019.
Undergraduate Scholarship Committee, College of Engineering, University of Utah, 2014 – 2019.
Library Policy Advisory Committee, University of Utah, 2011 – 2014.
Technology Enhanced Curriculum Committee, University of Utah, 2010 – 2013.
Humanities Area Committee, University of Utah, 2009 – 2012.
Duke University Postdoctoral Association, Executive Board 2006 – 2007, President 2008.
Boston University Student Association of Graduate Engineers, Officers' Committee, 1998 – 2003.

Department / Institute

Graduate Admissions Committee, Biomedical Engineering Department, U of Utah, 2017 – *present*.
Undergraduate Committee, Biomedical Engineering Department, University of Utah, 2016 – *present*.
Graduate Committee, Biomedical Engineering Department, University of Utah, 2010 – *present*.
Controlled Substances Coordinator, SMBB Neuroscience Core, University of Utah 2010 – 2023.
BioMedical Engineering Society, Student Chapter Adviser, University of Utah, 2013 – 2020.
Undergraduate Scholarship Committee, Bioengineering Department, University of Utah, 2011 – 2019.
Masters of Science/Bachelor of Science Adviser, Bioengineering Dept., U. of Utah, 2010 – 2019.
Neuroscience Initiative Episodic Brain Dysfunction Steering Committee, U. of Utah, 2015 – 2017.
Program in Neuroscience, Admissions Committee, University of Utah, 2013 – 2016.
Mountain West Biomedical Engineering Conference, Faculty Advisor, 2010.

Local Outreach

Mr/Ms Biomedical Engineer Pageant, Judge, 2016, 2017, 2018
Bench-to-Bedside Competition, Judge, 2017
Utah First Lego League Championship, Statewide Head Project Judge, 2011, 2012.

Editorial Service

Brain Sciences Frontiers in Neuroscience

Review Service

Annals of Biomedical Engineering	BioMed Central (BMC) Neurology
Biomedical Signal Processing and Control	Brain and Behavior
Brain Sciences	Brain Stimulation

Chaos	Computers in Biology and Medicine
Current Opinion in Biomedical Engineering	Current Research in Neurobiology
Entropy	Experimental Neurology
Frontiers in Neuroanatomy	Frontiers in Neurology
Frontiers in Systems Neuroscience	Journal of Bioeng. & Biomedical Science
Journal of Neural Engineering	Journal of Neurophysiology
Journal of Neuroscience	Journal of Neuroscience Methods
Journal of Neuroscience Research	Network: Computation in Neural Systems
Neural Computation	Neural Regeneration Research
Neuromodulation: Tech. at the Neural Interface	Neuropsychiatric Disease and Treatment
Open Neuroscience Journal	PLoS Computational Biology
PLoS One	Proceedings National Academy of Sciences
Scientific Reports	Trans. on BioMedical Engineering (IEEE)
Trans. On Neural Systems & Rehab. Eng. (IEEE)	

VIII. Intellectual Property

Inventions Disclosed

- i. **Dorval AD**, “Identifying activated neural tracts to treat neurological disorders.” *filed with University of Utah PIVOT*, Aug. 13, 2021.
- ii. **Dorval AD**, Schister S, “Methods to stabilize neuromotor control signals for long-term, reliable brain-machine interfaces.” *filed with University of Utah TCO*, Mar. 15, 2012.
- iii. **Dorval AD**, Willsie AC, Polar-Cabrera CA, “Circuitry to enable simultaneous recording and stimulation of neural tissue from the same electrode contact.” *filed with University of Utah TCO*, Mar. 17, 2011.

Patents Pending

- i. Grill WM, **Dorval AD**. “Non-regular electrical stimulation patterns for treating neurological disorders.” U.S. Application #18/138,176. August 24, 2023.
- ii. Grill WM, **Dorval AD**, Strother R. “Non-regular electrical stimulation patterns for treating neurological disorders.” U.S. Application #17/327,836. September 9, 2021.

Patents Issued

1. Grill WM, **Dorval AD**. “Non-regular electrical stimulation patterns for treating neurological disorders.” U.S. Patent #11,633,605. April 25, 2023.
2. Grill WM, **Dorval AD**, Strother R. “Non-regular electrical stimulation patterns for treating neurological disorders.” U.S. Patent #11,013,924. May 25, 2021.
3. **Dorval AD**, Willsie AC. “Charge steering high-density electrode array for deep brain stimulation.” U.S. Patent #10,124,160. November 13, 2018.
4. Grill WM, **Dorval AD**. “Non-regular electrical stimulation patterns for treating neurological disorders.” U.S. Patent #10,086,204. October 2, 2018.
5. Grill WM, **Dorval AD**. “Non-regular electrical stimulation patterns for treating neurological disorders.” U.S. Patent #10,086,205. October 2, 2018.
6. Grill WM, **Dorval AD**. “Non-regular electrical stimulation patterns for treating neurological disorders.” U.S. Patent #9,744,363. August 29, 2017.
7. Grill WM, **Dorval AD**. “Non-regular electrical stimulation patterns for treating neurological disorders using a cost function.” U.S. Patent #9,259,579. February 16, 2016.
8. Grill WM, **Dorval AD**. “Non-regular electrical stimulation for treating neurological disorders.” U.S. Patent #8,447,405. May 21, 2013.

IX. Publications

Manuscripts

- i. Charlebois CM, Anderson DN, Smith EH, Davis TS, Newman BJ, Peters AY, Arain AM, **Dorval AD**, Rolston JD, Butson CR. “Circadian changes in aperiodic activity are correlated with seizure reduction in

patients with mesial temporal lobe epilepsy treated with responsive neurostimulation.” *Epilepsia*, in press Feb 2024.

- ii. Taheri M, **Dorval AD**, White JA. “Modeling the variability of spontaneous astrocyte calcium activity and responses to repeated stimuli.” *revising for spring 2024 submission*.
- iii. Louie KJ, **Dorval AD**. “Synaptic inputs can tune independently neuronal firing rate, entropy, and information in model neurons.” *editing for spring 2024 submission*.
- iv. Polar CA, **Dorval AD**. “Beta coherence and movement dynamics in a parkinsonian rat model.” *editing for spring 2024 submission*.

Publications and Book Chapters

1. Caston RM, Wilson MG, Comeaux PD, **Dorval AD** (2022). “Stochastic resonance governs memory consolidation accuracy in a neural network model.” *Proc of the IEEE Eng in Med and Biol Soc*, 2022:2254-2257, PMID36085728.
2. Charlebois CM, Anderson DN, Johnson KA, Philip BJ, Davis TS, Newman BJ, Peters AY, Arain AM, **Dorval AD**, Rolston JD, Butson CR (2022). “Patient-specific structural connectivity informs outcomes of responsive neurostimulation for temporal lobe epilepsy.” *Epilepsia*, 63(8):2037-2055, PMID35560062.
3. Charlebois CM, Caldwell DJ, Rampersad S, Janson AP, Ojemann JG, Brooks DH, MacLeod RS, Butson CR, **Dorval AD** (2021). “Validating patient-specific finite element models of direct electrocortical stimulation.” *Front Neurosci*, 15(601701), PMC:8365306.
4. Anderson DN, **Dorval AD**, Rolston JD, Pulst SM, Anderson CJ (2021). “Computational investigation of the impact of deep brain stimulation contact size and shape on neural selectivity.” *J Neural Eng*, 18(5):056004, PMC:8440674.
5. Anderson CJ, Anderson DN, Pulst SM, Butson CR, **Dorval AD** (2020). “Neural selectivity, efficiency, and dose equivalence in deep brain stimulation through pulse width tuning and segmented electrodes.” *Brain Stimulation*, 13(4), PMC:7308191.
6. Anderson CJ, Sheppard D, **Dorval AD** (2020). “Parkinsonism and subthalamic deep brain stimulation dysregulate behavioral motivation in a rodent model.” *Brain Research*, 1736:146776, PMC:4491629.
7. Anderson DN, Anderson CB, Lanka N, Sharma R, Butson CR, Baker BB, **Dorval AD** (2019). “The μ DBS: multiresolution directional deep brain stimulation from improved targeting of small diameter fibers.” *Front Neurosci*, 13:1152, PMC:6828644.
8. Ereifej E, Shell C, Schofield J, Charkhkar H, Cuberovic I, **Dorval AD**, Graczyk E, Kozai T, Otto K, Tyler D, Welle C, Widge A, Zariffa J, Moritz C, Bourbeau D, Marasco P (2019). “Neural engineering: the process, applications, and its role in the future of medicine.” *J Neural Eng*, 16(6):063022, PMC:7875502.
9. Rampersad S, Roig-Solvas B, Yarossi M, Kulkarni PP, Santarnecchi E, **Dorval AD**, Brooks D (2019). “Prospects for transcranial temporal interference stimulation in humans: A computational study.” *NeuroImage*, 15(202):116124, PMC:68129277.
10. Duffley G, Anderson DN, Vorwerk J, **Dorval AD**, Butson CR (2019). “Evaluation of methodologies for computing the deep brain stimulation volume of tissue activated.” *J Neural Eng*, 16(6):066024, PMC:1834769.
11. Anderson CJ, Figueroa KP, **Dorval AD**, Pulst SM (2019). “Deep cerebellar stimulation reduces motor symptoms in the shaker rat.” *Annals of Neurology*, 85(5), PMC:8098166.
12. Anderson DN, Duffley G, Vorwerk J, **Dorval AD**, Butson CR (2019). “Anodic stimulation misunderstood: preferential activation of fiber orientations with anodic waveforms in deep brain stimulation.” *J Neural Eng*, 16(1):016026, PMC:6889961.
13. Polar CA, Gupta R, Lehmkuhle MJ, **Dorval AD** (2018). “Correlation between cortical beta power and gait speed is suppressed in a parkinsonian model, but restored by therapeutic deep brain stimulation.” *Neurobiology of Disease*, 117:137-148, PMID:29859320.
14. Febinger HY, **Dorval AD**, Rolston JD (2018). “A sordid affair: spike sorting and data reproducibility.” *Neurosurgery*, 82(3):N19-N20, PMID:29462436.
15. Anderson DN, Osting B, Vorwerk J, **Dorval AD**, Butson CR (2018). “Optimized programming algorithm for cylindrical and directionally segmented deep brain stimulation electrodes.” *J Neural Eng*, 15(2):026005, PMID:29235446.

16. Patel YA, **Dorval AD**, White JA, Chistini DJ, Butera RJ (2017) "Hard real-time closed-loop electrophysiology with Real-Time eXperiment Interface (RTXI)." *PLoS Comput Biol*, 13(7):e1005656, PMC:5469488.
17. King NO, Anderson CJ, **Dorval AD** (2016) "Deep brain stimulation exacerbates hypokinetic dysarthria in a rat model of parkinsonism." *J Neurosci Res*, 94(2):128-138, PMC4681650.
18. **Dorval AD**, Muralidharan A, Jensen AL, Baker KJ, Vitek JL (2015) "Information in pallidal neurons increases with parkinsonian severity." *Parkinsonism Relat Disord*, 21(11):1355-1361, PMC:4361644.
19. Willsie AC, **Dorval AD** (2015) "Computational field shaping for deep brain stimulation with thousands of contacts in a novel electrode geometry." *Neuromodulation* 18(7):542-551, PMID:26245306.
20. Anderson CJ, Sheppard DT, Huynh R, Anderson DN, Polar CA, **Dorval AD** (2015) "Subthalamic deep brain stimulation reduces pathological information transmission to the thalamus in a rat model of parkinsonism." *Front Neural Circuits*, 9(31). PMC4491629.
21. Willsie AC, **Dorval AD** (2015) "Fabrication and initial testing of the μ DBS: a novel deep brain stimulation electrode with thousands of individually controllable contacts." *Biomed Microdevices* 17(3):58, PMID:25981752.
22. **Dorval AD**, Grill WM (2014) "Deep brain stimulation restores neuronal information transmission in the 6-OHDA rat model of parkinsonism." *J. Neurophysiol*, 111(10):1949-1959. PMC4044335.
23. Ortega FA, Butera RJ, Christini DJ, White JA, **Dorval AD** (2014) "Dynamic clamp in cardiac and neuronal systems using RTXI." *Methods in Molecular Biology: Patch Clamp*, Humana Press, Totowa, NJ, 1183:327-354, PMC:4880480.
24. Willsie AC, **Dorval AD** (2013) "Charge steering in a novel DBS electrode may accommodate surgical targeting errors." *Proc IEEE Neural Eng Res* 152-153, doi:10.1109/NER.2013.6695894.
25. Broicher T, Malerba P, **Dorval AD**, Borisjuk A, Fernandez FR, White JA (2012) "Spike phase locking in CA1 pyramidal neurons depends on background conductance and firing rate." *J Neurosci* 32(41):14374-14388. PMC3506380.
26. Birdno MJ, Kuncel AM, **Dorval AD**, Turner DA, Gross RE, Grill WM (2012) "Stimulus features underlying reduced tremor suppression with temporally patterned DBS." *J Neurophysiol*, 107(1):364-383. PMC3349684.
27. Sharma R, Tathireddy P, Lee S, Reith L, Bamberg E, **Dorval AD**, Normann R, Solzbacher F (2011) "Application-specific customizable architectures of Utah neural interfaces." *Procedia Engineering* 25:1016-1019. DOI:10.1016/j.proeng.2011.12.250.
28. **Dorval AD** (2011) "Estimating neuronal information: logarithmic binning of neuronal inter-spike intervals." *Entropy* 13(2):485-501. PMC4020285.
29. **Dorval AD**, Kuncel AM, Birdno MJ, Turner D, Grill WM (2010) "Deep brain stimulation alleviates parkinsonian bradykinesia by regularizing pallidal activity." *J Neurophysiol*, 104(2):911-921. PMC2934941.
30. **Dorval AD**, Panjwani N, Qi RY, Grill WM (2009) "Deep brain stimulation that abolishes parkinsonian activity in basal ganglia improves thalamic relay fidelity in a computational circuit." *Proc IEEE EMBS*, 1:4230-4233. PMC2819373.
31. **Dorval AD** (2008) "Probability distributions of the logarithm of inter-spike intervals yield accurate entropy estimates from small datasets." *J Neurosci Meth* 173(1):129-139. PMC2610469.
32. Birdno MJ, Kuncel AM, **Dorval AD**, Turner DA, Grill WM (2008) "Tremor varies as a function of the temporal regularity of deep brain stimulation." *NeuroReport*, 19(5):599-602. PMC2586391.
33. **Dorval AD**, Russo GS, Hashimoto T, Xu W, Grill WM, Vitek JL (2008) "Deep brain stimulation reduces neuronal entropy in the MPTP-primate model of Parkinson's disease." *J Neurophysiol*, 100(5): 2807-2818. PMC2585386.
34. Haas JS, **Dorval AD**, White JA (2007) "Contributions of I_h to feature selectivity in layer II stellate cells of the entorhinal cortex." *J Comput Neurosci*, 22(2):161-171. PMID:17053992.
35. **Dorval AD**, Bettencourt JB, Netoff TI, White JA (2007) "Hybrid neuronal network studies under dynamic clamp." *Methods in Molecular Biology: Applied Patch Clamp*, Humana Press, Totowa, NJ. PMID:18827998
36. **Dorval AD**. (2006) "The rhythmic consequences of ion channel stochasticity." *Neuroscientist* 12(5):442-448. PMID:16957006.

37. **Dorval AD**, White JA (2006) "Synaptic input statistics tune the variability and reproducibility of neuronal responses." *Chaos*, 16(2):26105. **selected as highlight publication 7/1/2006: *Virtual Journal of Biological Physics Research*. PMID:16822037.
38. White JA, **Dorval AD** (2005) "Neuro-electric principles." *The Electrical Engineering Handbook*, 3rd edition. Dorf RC (Ed.), CRC Press, Boca Raton.
39. **Dorval AD**, White JA (2005) "Channel noise is essential for perithreshold oscillations in entorhinal stellate neurons." *J Neurosci*, 25(43):10025-10028. PMID:16251451.
40. Netoff TI, Banks MI, **Dorval AD**, Acker CD, Haas JS, Kopell N, White JA (2005) "Synchronization in hybrid neuronal networks of the hippocampal formation." *J Neurophysiol*, 93(3):1197-1208. PMID:15525802.
41. **Dorval AD** (2004) "Probing the role of noise in the superficial medial entorhinal cortex." *Doctoral Dissertation*, Boston University, Boston MA.
42. **Dorval AD**, Netoff TI, White JA (2003) "Real-time experimental control in cellular neurophysiology." *Proc IEEE Neural Eng Res*, 71-74. doi:10.1109/CNE.2003.1196758.
43. White JA, Netoff TI, **Dorval AD**, Banks MI (2003) "Assessing neuronal synchronization properties using spike time response methods." *Proc IEEE EMBS*, 3:2235-2238. doi:10.1109/IEMBS.2003.128207.
44. White JA, Netoff TI, Acker CD, **Dorval AD**, Haas JS (2002) "The biophysical bases of synchronous activity in the hippocampal formation." *Proc IEEE EMBS*, 3:1958-1959, doi:10.1109/IEMBS.2002.1053114.
45. **Dorval AD**, Christini DJ, White JA (2001). "Real-time linux dynamic clamp: a fast and flexible way to construct virtual ion channels in living cells." *Ann Biomed Eng*, 29: 897-907. PMID:11764320.
46. White JA, Haas JS, **Dorval AD** (1999) "Stochastic dynamic clamping as a method for studying the effects of biological noise sources." *Proc IEEE EMBS*, 2:880. doi:10.1109/IEMBS.1999.804035.

Conference Abstracts (National & International)

47. Craig J, Charlebois CM, Weaver KE, Brooks D, Ojemann J, Rampersad S, **Dorval AD**. "Creating patient-specific computational models for off-contact stimulation from stereo-electroencephalography leads." *BioMedical Engineering Society, annual meeting*, Oct. 2023.
48. Charlebois CM, Anderson DN, Smith EH, Davis TS, Newman BJ, Peters AY, Arain AM, **Dorval AD**, Rolston JD, Butson CR. "Circadian changes in aperiodic activity are correlated with seizure reduction in patients with mesial temporal lobe epilepsy treated with responsive neurostimulation." *International Neuromodulation Society, annual conference*, Sept. 2023.
49. Charlebois CM, Anderson DN, Smith EH, Davis TS, Newman BJ, Peters AY, Arain AM, **Dorval AD**, Rolston JD, Butson CR. "Circadian changes in aperiodic activity are correlated with seizure reduction in patients with mesial temporal lobe epilepsy treated with responsive neurostimulation." *InterfaceRice: Conference on Neuroengineering, annual conference*, May 2023.
50. Rampersad S, Roig-Solvas B, Yarossi M, **Dorval AD**, Brooks DH. "Efficient optimization of transcranial temporal interference stimulation (tTIS)." *Brain Stimulation, annual meeting*, 16(1):138, DOI:10.1016/j.brs.2023.01.075, Feb. 2023.
51. Weaver KE, Paschall CJ, Ko A, Charlebois CM, Davis T, Brooks D, Rolston JD, Rampersad S, **Dorval AD**, Herron J, Ojemann J. "Validating multi-source current steering in stereotactic depth electrodes." *Brain Stimulation, annual conference*, Feb. 2023.
52. Charlebois CM, Anderson DN, Johnson KA, Philip BJ, Davis TS, Newman BJ, Peters AY, Arain AM, **Dorval AD**, Rolston JD, Butson CR. "Patient-specific structural connectivity predicts outcomes of responsive neurostimulation for temporal lobe epilepsy." *International Neuromodulation Society, annual conference*, May 2022.
53. Rampersad S, Roig-Solvas B, Yarossi M, **Dorval AD**, Brooks D. "An efficient algorithm for electrode optimization of transcranial temporal interference." *Brain Stimulation, annual conference*, Dec. 2021.
54. Charlebois CM, Anderson DN, Johnson KA, Philip BJ, Newman BJ, Peters AY, Arain AM, **Dorval AD**, Rolston JD, Butson CR. "Cohort analysis of activation volumes and responsive neurostimulation parameters in patients with mesial temporal lobe epilepsy." *Society for Neuroscience, annual conference*, Nov. 2021.
55. Charlebois CM, Anderson DN, Johnson KA, Philip BJ, Newman BJ, Peters AY, Arain AM, **Dorval AD**, Rolston JD, Butson CR. "Predictors of seizure reduction in patients with mesial temporal lobe epilepsy treated with responsive neurostimulation." *American Epilepsy Society, annual conference*, Nov. 2020.

56. Heck B, Yarossi M, Roig-Solvas B, Rampersad S, Brooks D, **Dorval AD**. “Computational assessment of temporal interference stimulation’s capabilities in neuronal activation.” *BioMedical Engineering Society, annual meeting*, Oct. 2020.
57. Rampersad S, Roig-Solvas B, Yarossi M, **Dorval AD**, Brooks D. “Modeling and optimization of transcranial temporal interference stimulation.” *Neuromodec, annual meeting*, Apr. 2020.
58. Charlebois CM, Philip BJ, Anderson DN, Butson CR, **Dorval AD**. “Patient-specific computational models of cortical activation for seizure improvement.” *Society for Neuroscience, annual meeting*, Nov. 2019.
59. Rampersad S, Roig-Solvas B, Yarossi M, Santarnecchi E, **Dorval AD**, Brooks D. “Optimization of transcranial temporal interference stimulation of targets of interest using realistic human head models.” *Society for Neuroscience, annual meeting*, Nov. 2019.
60. Weng G, Febinger HY, **Dorval AD**. “A rat model of parkinsonism with increasing dopaminergic degeneration & motor symptom progression biomedical engineering.” *BioMedical Engineering Society, annual meeting*, Oct. 2019.
61. Charlebois CM, Philip BJ, Anderson DN, Butson CR, **Dorval AD**. “Differential response to anodic and cathodic cortical stimulation for seizure arrest.” *BioMedical Engineering Society, annual meeting*, Oct. 2019.
62. Polar CA, Hoyer GL, **Dorval AD**. “Cortico-subthalamic beta-coherence suppression during high-intensity, self-directed motion in a PD rat model.” *BioMedical Engineering Society, annual meeting*, Oct. 2019.
63. Charlebois CM, Philip BJ, Anderson DN, **Dorval AD**, Butson CR. “Patient-specific computational models of cortical activation for seizure improvement.” *Park City Epilepsy Conference*, Sept. 2019.
64. Anderson CJ, Anderson DN, Pulst SM, Butson CR, **Dorval AD**. “Neural selectivity, efficiency, and dose equivalence in deep brain stimulation through pulse width tuning and segmented electrodes.” *Minnesota Neuromodulation Symposium*, Apr. 2019.
65. Polar CA, Hoyer GL, **Dorval AD**. “Cortico-subthalamic beta-coherence suppression during high-intensity, self-directed motion in a parkinsonian rat model.” *IEEE EMBS Conference on Neural Engineering Research*, Mar. 2019.
66. Charlebois CM, Shayestehfard K, Anderson DN, Janson A, Cronin J, Dannhauer M, Caldwell D, Rampersad S, Sorensen L, Ojemann J, Brooks D, MacLeod R, Butson CR, **Dorval AD**. “Validating cortical surface electrode localization uncertainty with stimulation and clinical stimulation.” *Society for Neuroscience, annual meeting*, Nov. 2018.
67. Taheri M, **Dorval AD**, White JA. “Modeling the variability of spontaneous astrocyte calcium activity and responses to repeated stimuli.” *Society for Neuroscience, annual meeting*, Nov. 2018.
68. Anderson DN, Duffley G, Vorwerk J, **Dorval AD**, Butson CR. “Anodic stimulation misunderstood: preferential activation of fiber orientations with anodic waveforms in deep brain stimulation.” *Society for Neuroscience, annual meeting*, Nov. 2018.
69. Duffley G, Anderson DN, Vorwerk J, **Dorval AD**, Butson CR. “The activating function based volume of tissue activated (VTA): an axon orientation and projection independent method for predicting neural activation by deep brain stimulation (DBS).” *Society for Neuroscience, annual meeting*, Nov. 2018.
70. Taheri M, **Dorval AD**, White JA. “Modeling the variability of spontaneous astrocyte calcium activity and responses to repeated stimuli.” *Biomedical Engineering Society, annual meeting*, Oct. 2018.
71. Charlebois CM, Shayestehfard K, Anderson DN, Janson A, Cronin J, Dannhauer M, Caldwell D, Rampersad S, Sorensen L, Ojemann J, Brooks D, MacLeod R, Butson CR, **Dorval AD**. “Quantification of lead localization uncertainty in computational modeling of electrocorticography stimulation and recording.” *Biomedical Engineering Society, annual meeting*, Oct. 2018.
72. Rampersad S, Yarossi M, Shayestehfard K, Roig-Solvas B, **Dorval AD**, Brooks D. “Simulations of temporal interference tCS in a realistic head model.” *Neuromodulation Conference*, Aug. 2018.
73. Taheri M, **Dorval AD**, White JA. “Modeling the variability of spontaneous astrocyte calcium activity and responses to repeated stimuli.” *Computational NeuroScience, annual meeting*, Jul. 2018.
74. Anderson DN, Duffley G, Vorwerk J, **Dorval AD**, Butson CR. “Anodic stimulation misunderstood: preferential activation of fiber orientations with anodic waveforms in deep brain stimulation.” *Neural Interfaces Conference*, Jun. 2018.
75. Anderson CJ, Figueroa KP, **Dorval AD**, Pulst SM. “Low-frequency deep cerebellar stimulation improves gait ataxia, tremor, and falling in a rodent model of ataxia.” *Neural Interfaces Conference*, Jun. 2018.

76. Caldwell D, Cronin J, Charlesbois C, Gkogkidis CA, Shayestehfard K, Guler S, Dannhauer M, Ko AL, MacLeod RS, Ball T, **Dorval AD**, Brooks DH, Ojemann JG, Sorenson LB. "OPTISTIM — Combining computational neuroscience and electrophysiology for optimal cortical electric stimulation." *Collaborative Research in Computational Neuroscience, annual meeting*, Jun. 2018.
77. Febinger HY, Henry C, **Dorval AD**. "A model of gradual dopamine depletion in the rat." *Society for Neuroscience, annual meeting*, Nov. 2017.
78. Moesinger R, Febinger HY, **Dorval AD**. "Continuous analysis of parkinsonian rodent gait via frustrated total internal reflection." *Biomedical Engineering Society, annual meeting*, Oct. 2017.
79. Anderson CJ, **Dorval AD**, Pulst SM. "Dentate nucleus deep cerebellar stimulation reduces motor symptoms of degenerate cerebellar ataxias." *Minnesota Neuromodulation Symposium*, Apr. 2017.
80. Febinger HY, Henry CM, **Dorval AD**. "Behavioral assessment of gradual dopamine depletion in the rat." *International Basal Ganglia Society Meeting*, Mar. 2017.
81. Anderson CJ, **Dorval AD**. "DBS of the STN creates impulse control disorders and fails to restore parkinsonian apathy and action selection deficits." *Society for Neuroscience, annual meeting*, Nov. 2016.
82. Anderson DN, Osting B, **Dorval AD**, Butson CR. "Optimized programming algorithm for cylindrical and directionally segmented deep brain stimulation electrodes." *Society for Neuroscience, annual meeting*, Nov. 2016.
83. **Dorval AD**, King NO, Anderson CJ. "Stimulation of the subthalamic nucleus exacerbates dysarthria in a rat model of parkinsonism." *Society for Neuroscience, annual meeting*, Nov. 2016.
84. Lambert KM, White JA, **Dorval AD**. "Development of an in vivo model of basal ganglia pathway isolation for study of information transmission." *Society for Neuroscience, annual meeting*, Nov. 2016.
85. Anderson DN, Osting B, **Dorval AD**, Butson CR. "Optimized programming algorithm for cylindrical and directionally segmented deep brain stimulation electrodes." *Biomedical Engineering Society, annual meeting*, Oct. 2016.
86. Lambert KM, White JA, **Dorval AD**. "A rat model for isolating basal ganglia pathways for the study of information transmission." *Biomedical Engineering Society, annual meeting*, Oct. 2016.
87. Anderson DN, Osting B, Vorwerk J, **Dorval AD**, Butson CR. "Optimized programming algorithm for cylindrical and directionally segmented deep brain stimulation electrodes." *North American Neuromodulation Society, annual meeting*, Jun. 2016.
88. Anderson CJ, Shepherd D, **Dorval AD**. "STN-DBS creates impulse disorders and fails to restore parkinsonian apathy and action selection deficits." *North American Neuromodulation Society, annual meeting*, Jun. 2016.
89. Anderson DN, Willsie AC, Butson CR, **Dorval AD**. "Toward the implementation of a novel DBS electrode for targeted neural activation." *Society for Neuroscience, annual meeting*, Oct. 2015.
90. Anderson CJ, Shepherd D, Huynh R, Anderson DN, Polar-Cabrera C, **Dorval AD**. "Subthalamic DBS reduces pathological information transmission to the thalamus in a rat mode of parkinsonism." *Society for Neuroscience, annual meeting*, Oct. 2015.
91. Polar CA, **Dorval AD**. "Synchronization of EEG and behavioral recordings in healthy and hemi-parkinsonian rodents using a low power micro-recording embedded system." *Biomedical Engineering Society, annual meeting*, Oct. 2015.
92. Anderson CJ, Shepherd D, Huynh R, Anderson DN, Polar-Cabrera C, **Dorval AD**. "Subthalamic DBS reduces pathological information transmission to the thalamus in a rat mode of parkinsonism." *Minnesota Neuromodulation Symposium*, Apr. 2015.
93. George A, Patel Y, Ortega F, White JA, Christini D, **Dorval AD**, Butera R. "The real-time eXperiment interface: a closed-loop data acquisition system with sub-millisecond latencies for electrophysiology." *Society for Neuroscience, annual meeting*, Nov. 2014.
94. Anderson CJ, **Dorval AD**. "Information as theoretic metrics as biomarkers of parkinsonian symptom severity." *Society for Neuroscience, annual meeting*, Nov. 2014.
95. Lambert KM, White JA, **Dorval AD**. "An acute pharmacological approach for the study of information transmission through basal ganglia." *Society for Neuroscience, annual meeting*, Nov. 2014.
96. Anderson CJ, **Dorval AD**. "Information as theoretic metrics as biomarkers of parkinsonian symptom severity." *Biomedical Engineering Society, annual meeting*, Oct. 2014.

97. Anderson CJ, **Dorval AD**. "Information-theoretic metrics as biomarkers of parkinsonian symptom severity." *Neural Interfaces Conference*, Jun. 2014.
98. Polar CA, Gupta R, **Dorval AD**, Lehmkuhle MJ. "Motion-sensitive changes in cortical beta power, in a rat model of parkinsonism with DBS." *Neural Interfaces Conference*, Jun. 2014.
99. Anderson CJ, **Dorval AD**. "Information theoretic metrics as biomarkers of Parkinson's disease symptom severity." *Minnesota Neuromodulation Symposium*, Apr. 2014.
100. Willsie AC, **Dorval AD**. "Charge steering in a novel DBS electrode may accommodate surgical targeting errors." *Society for Neuroscience, annual meeting*, Oct. 2013.
101. Polar CA, Gupta R, Lehmkuhle MJ, **Dorval AD**. "Beta and low-gamma cortical waves during different states of motion in 6-OHDA hemi-parkinsonian rats." *IEEE EMBS Conference on Neural Engineering*, Oct. 2013.
102. Anderson CJ, **Dorval AD**. "Exploring the mechanisms of response time and action-suppression deficits correlated with Parkinson's disease and deep brain stimulation." *Biomedical Engineering Society, annual meeting*, Sept. 2013.
103. **Dorval AD**, Jensen AL, Baker KB, Vitek JL. "Neural information in globus pallidus degrades with increasing parkinsonian severity." *Biomedical Engineering Society, annual meeting*, Sept. 2013.
104. Polar CA, **Dorval AD**. "Cost-efficient animal tracking system used for the study of beta and gamma waves from primary motor cortex during movement in parkinsonian rats." *Biomedical Engineering Society, annual meeting*, Sept. 2013.
105. Willsie AC, **Dorval AD**. "Charge steering DBS accommodates non-optimal targeting." *Biomedical Engineering Society, annual meeting*, Sept. 2013.
106. **Dorval AD**, Grill WM. "Deep brain stimulation restores information processing in a rodent model of parkinsonism." *Biomedical Engineering Society, annual meeting*, Oct. 2012.
107. Polar CA, **Dorval AD**. "Active feedback system to record and stimulate simultaneously from a single electrode during deep brain stimulation." *Biomedical Engineering Society, annual meeting*, Oct. 2012.
108. Willsie AC, **Dorval AD**. "A novel, high-contact deep brain stimulating electrode for charge steering." *Biomedical Engineering Society, annual meeting*, Oct. 2012.
109. Broicher T, Malbera P, **Dorval AD**, Borisjuk A, Fernandez FR, White JA. "Spike phase locking in CA1 pyramidal neurons depends on background conductance and firing rate." *Society for Neuroscience, annual meeting*, Oct. 2012.
110. **Dorval AD**, Jensen AL, Baker KB, Vitek JL. "Directed information in globus pallidus neurons decreases with increasing parkinsonian severity." *Society for Neuroscience, annual meeting*, Oct. 2012.
111. Lehmkuhle MJ, Rossi CA, **Dorval AD**. "The evolution of cortical oscillations in a rate model of Parkinson's disease." *Society for Neuroscience, annual meeting*, Oct. 2012.
112. Lehmkuhle MJ, **Dorval AD**, Hendricks JL, Arps J, Richardson-Burns SM. "Cortical field recordings from chronically implanted microECoG arrays with conducting polymer coated electrodes show low impedance and high stability over time." *Neural Interfaces Conference*, Jun. 2012.
113. Polar CA, **Dorval AD**. "Simultaneous recording and stimulation from a single electrode during DBS using an active feedback system." *Neural Interfaces Conference*, Jun. 2012.
114. Willsie AC, **Dorval AD**. "High contact number electrode for deep brain stimulation." *Neural Interfaces Conference*, Jun. 2012.
115. King Z, Lehmkuhle MJ, **Dorval AD**, Hendricks JL, Arps J, Richardson-Burns SM. "Conducting polymer electrode coatings improve the in vivo performance of microECoG arrays for neural applications." *Society for Neuroscience, annual meeting*, Nov. 2011.
116. Polar CA, Frerck MJ, **Dorval AD**, Lehmkuhle MJ. "Real-time feedback control of cortical beta activity via subthalamic nucleus stimulation in a parkinsonian rat model." *Society for Neuroscience, annual meeting*, Nov. 2011.
117. **Dorval AD**. "Logarithmic inter-spike interval distributions enable robust neuronal information estimates." *Biomedical Engineering Society, annual meeting*, Oct. 2011.
118. Tathireddy P, Bamberg E, Lee S, Sharma R, Rieth L, Martinez JJ, **Dorval AD**, White JA, Slozbacher F. "High aspect ratio Utah microelectrode array for neural interface applications." *Society for Neuroscience, annual meeting*, Nov. 2010.

119. Birdno MJ, Kuncel AM, **Dorval AD**, Turner DA, Gross RE, Grill WM. "Stimulus features underlying reduced tremor suppression during deep brain stimulation (DBS) with temporally irregular patterns." *Society for Neuroscience, annual meeting*, Oct. 2009.
120. **Dorval AD**, Grill WM. "High frequency stimulation reduces disordered neuronal activity and alleviates parkinsonian symptoms in the 6-OHDA rat model." *Society for Neuroscience, annual meeting*, Oct. 2009.
121. Qi RY, **Dorval AD**, Grill WM. "Deep brain stimulation regularizes patterns of neuronal firing in a rat model of Parkinson's disease." *Society for Neuroscience, annual meeting*, Oct. 2009.
122. Birdno MJ, Kuncel AM, **Dorval AD**, Turner D, Grill WM. "Correlation of human tremor responses with model neuron spike patterns during deep brain stimulation." *BioMedical Engineering Society, annual meeting*, Oct. 2008.
123. Qi RY, **Dorval AD**, Grill WM. "Computational modeling of the effects of rate and regularity of deep brain stimulation." *BioMedical Engineering Society, annual meeting*, Oct. 2008.
124. **Dorval AD**, Kuncel AM, Birdno MJ, Turner D, Grill WM. "Deep brain stimulation that regularizes neural activity alleviates parkinsonian motor symptoms." *Neural Interfaces Conference*, Jun. 2008.
125. Birdno MJ, Kuncel AM, **Dorval AD**, Turner D, Grill WM. "Tremor reduction by deep brain stimulation (DBS) is dependent on stimulation rate and regularity." *Society for Neuroscience, annual meeting*, Nov. 2007.
126. **Dorval AD**, Kuncel AM, Birdno MJ, Turner D, Grill WM. "Deep brain stimulation that regularizes thalamic throughput alleviates parkinsonian bradykinesia." *Society for Neuroscience, annual meeting*, Nov. 2007.
127. **Dorval AD**, Kuncel AM, Birdno MJ, Turner D, Grill WM. "High frequency stimulation that regularizes thalamic activity treats parkinsonian bradykinesia." *BioMedical Engineering Society, annual meeting*, Sept. 2007.
128. **Dorval AD**, Russo GS, Hashimoto T, Xu W, Vitek JL, Grill WM. "Pallidal neurons phase lock to high frequency stimulation of the subthalamic nucleus." *Society for Neuroscience, annual meeting*, Oct. 2006.
129. **Dorval AD**, Russo GS, Hashimoto T, Xu W, Vitek JL, Grill WM. "Pallidal neurons phase lock to deep brain stimulation in the subthalamic nucleus." *BioMedical Engineering Society, annual meeting*, Oct. 2006.
130. **Dorval AD**, Russo GS, Hashimoto T, Xu W, Vitek JL, Grill WM. "Effective deep brain stimulation eliminates disordered neural activity." *NIH & NINDS Neural Interfaces Workshop*, Aug. 2006.
131. **Dorval AD**, Russo GS, Hashimoto T, Xu W, Vitek JL, Grill WM. "Subthalamic high frequency stimulation regularizes pallidal and thalamic neural activity." *Society for Neuroscience, annual meeting*, Oct. 2005.
132. **Dorval AD**, Russo GS, Hashimoto T, Xu W, Vitek JL, Grill WM. "Deep brain stimulation puts neural activity back in order." *BioMedical Engineering Society, annual meeting*, Sept. 2005.
133. **Dorval AD**, Russo GS, Hashimoto T, Xu W, Vitek JL, Grill WM. "High frequency subthalamic stimulation restores order to pallidal firing patterns." *NIH & NINDS Neural Interfaces Workshop*, Sept. 2005.
134. White JA, Bettencourt J, **Dorval AD**, Netoff T. "Real-time virtual realities for living neurons." *BioMedical Engineering Society, annual meeting*, Sept. 2005.
135. **Dorval AD**, White JA. "Persistent sodium channel flicker enables normal theta-rhythmic activity in stellate cells of the medial entorhinal cortex." *Society for Neuroscience, annual meeting*, Nov. 2004.
136. **Dorval AD**, White JA. "Intrinsic noise broadens the spectrum of expressible neuronal behaviors." *BioMedical Engineering Society, annual meeting*, Oct. 2004.
137. **Dorval AD**, White JA. "Stellate cell responses to conductance input: reliability resonance in the theta frequency band." *Society for Neuroscience, annual meeting*, Nov. 2003.
138. **Dorval AD**, White JA. "Neurons respond differently to applied current and applied conductance." *BioMedical Engineering Society, annual meeting*, Oct. 2003.
139. Netoff TI, **Dorval AD**, White JA. "Hybrid neuronal networks of biological cells interacting with virtual counterparts." *BioMedical Engineering Society, annual meeting*, Oct. 2003.
140. Haas JS, **Dorval AD**, White JA. "Resonance and feature selectivity in stellate cells of the entorhinal cortex." *Society for Neuroscience, annual meeting*, Nov. 2002.
141. Netoff TI, **Dorval AD**, Acker CD, Kopell N, White JA. "Testing predictions of spike time response curve models on neuronal dynamics in medial entorhinal cortex." *Society for Neuroscience, annual meeting*, Nov. 2002.
142. **Dorval AD**, White JA. "General purpose dynamic clamp for constructing virtual ion channel conductances in living neurons." *Society for Neuroscience, annual meeting*, Nov. 2001.

143. **Dorval AD**, White JA. “A quick and inexpensive method to achieve real-time control in biomedical experiments.” *BioMedical Engineering Society, annual meeting*, Oct. 2001.
144. White JA, **Dorval AD**. “Effects of channel noise in the hippocampal formation.” *BioMedical Engineering Society, annual meeting*, Oct. 2000.

Conference Abstracts (Local & Regional)

145. Craig J, **Dorval AD**. “Creating patient-specific computational models for off-contact stimulation from stereo-electroencephalography leads.” *Utah Biomedical Engineering Conference*, Sept. 2023.
146. Craig J, **Dorval AD**. “Creating patient-specific computational brain models for deep brain stimulation for epilepsy.” *University of Utah Senior Research Symposium*, Apr. 2023.
147. Charlebois CM, Anderson DN, Johnson KA, Phillip BJ, Newman BJ, Peters AY, Arain AM, **Dorval AD**, Rolston JD, Butson CR. “Predictors of seizure reduction in patients with mesial temporal lobe epilepsy treated with responsive neurostimulation.” *Utah Biomedical Engineering Conference*, Feb. 2021.
148. Heck B, **Dorval AD**. “Temporal Interference stimulation is imprecise and activates non-target neurons.” *University of Utah Senior Research Symposium*, May 2020.
149. Weng G, Febinger HY, **Dorval AD**. “Evaluating the motor behavioral effects of gradual dopamine depletion.” *Utah Biomedical Engineering Conference*, Sept. 2019.
150. Heck B, **Dorval AD**. “Computational Study of the Utility and Characteristics of Temporal Interference Stimulation.” *Utah Biomedical Engineering Conference*, Sept. 2019.
151. Charlebois CM, Philip BJ, Anderson DN, Butson CR, **Dorval AD**. “Gait analysis to quantify progressing parkinsonian severity in rodent models.” *Utah Biomedical Engineering Conference*, Sept. 2019.
152. Anderson C, **Dorval AD**. “Fabrication of μ DBS for improved deep brain stimulation.” *University of Utah Undergraduate Research Seminar*, Apr. 2019.
153. Weng G, Febinger HY, **Dorval AD**. “Evaluating the motor behavioral effects of gradual dopamine depletion.” *University of Utah Undergraduate Research Seminar*, Apr. 2019.
154. Grimmer M, Febinger HY, **Dorval AD**. “Gait analysis to quantify progressing parkinsonian severity in rodent models.” *Utah Biomedical Engineering Conference*, Dec. 2018.
155. Hoyer G, Polar-Cabrera CA, **Dorval AD**. “LFP activity in the cortico-subthalamic network following deceleration events is predictive of future locomotive speed in freely moving rats.” *Utah Biomedical Engineering Conference*, Dec. 2018.
156. Lanka N, Nesterovich D, Willsie AC, **Dorval AD**. “Design, fabrication & validation of μ DBS – a novel deep brain stimulating electrode.” *Utah Bioengineering Symposium*, Dec. 2017.
157. Lambert KM, White JA, **Dorval AD**. “Development of an in vivo model of basal ganglia pathway isolation for study of information transmission.” *Utah Bioengineering Symposium*, Dec. 2017.
158. Anderson DN, Osting B, Vorwerk J, **Dorval AD**, Butson CR. “Optimized programming algorithm for cylindrical & directional deep brain stimulation electrodes.” *Snowbird Neuroscience Symposium*, Oct. 2017.
159. Anderson CJ, **Dorval AD**, Pulst SM. “Deep cerebellar stimulation to treat degenerative cerebellar ataxias.” *Snowbird Neuroscience Symposium*, Oct. 2017.
160. Anderson DN, Osting B, Vorwerk J, **Dorval AD**, Butson CR. “Optimized programming algorithm for cylindrical and directional deep brain stimulation electrodes.” *Utah Bioengineering Conference*, Dec. 2016.
161. Huynh R, **Dorval AD**. “Spike-timing dependent plasticity protocol for multiple neurons.” *Utah BioMedical Engineering Senior Research Symposium*, April 2017.
162. Henry C, Febinger HY, **Dorval AD**. “A model of gradual dopamine depletion in the rat.” *Biomedical Engineering West Regional Conference*, Jan 2017.
163. Febinger HY, Henry C, **Dorval AD**. “A model of gradual dopamine depletion in the rat.” *Utah Bioengineering Conference*, Dec. 2016.
164. Anderson DN, Osting B, Vorwerk J, **Dorval AD**, Butson CR. “Optimized programming algorithm for cylindrical and directional deep brain stimulation electrodes.” *Utah Bioengineering Conference*, Dec. 2016.
165. Febinger H, **Dorval AD**. “A model of gradual dopamine depletion in the rat.” *Utah Science, Technology and Advanced Research Confluence*, Oct. 2016.
166. Lanka N, Nesterovich D, Willsie AC, **Dorval AD**. “Design, fabrication & validation of μ DBS – a novel deep brain stimulating electrode.” *Utah Science, Technology and Advanced Research Confluence*, Oct. 2016.
167. Moesinger R, Febinger H, **Dorval AD**. “Studying rats using frustrated total internal reflection.” *Utah Science, Technology and Advanced Research Confluence*, Oct. 2016.

168. Einarson E, **Dorval AD**. "Localization of dopaminergic neurons in the basal ganglia." *Utah BioMedical Engineering Senior Research Symposium*, April 2016.
169. Hoyer G, Polar-Cabrera CA, **Dorval AD**. "Coherence of the subthalamic nucleus and motor cortex in a hemi-parkinsonian model rat model and the effects of deep brain stimulation." *State of Utah Conference for Undergraduate Research*, Feb. 2016.
170. Febinger HY, Einarson EA, **Dorval AD**. "Specific optogenetic targeting of the dorsal striatum of the mouse." *Utah Science, Technology and Advanced Research Confluence*, Sept. 2015.
171. Polar-Cabrera CA, Hoyer G, **Dorval AD**. "Microrecording device and machine learning used to study behavior changes of hemi-parkinsonian rats." *Access University of Utah Conference*, Apr. 2015.
172. Louie K, **Dorval AD**. "Neuronal information in an integrate-and-fire models." *Utah BioMedical Engineering Senior Research Symposium*, April 2015.
173. CJ, **Dorval AD**. "Information from efferent basal ganglia predicts parkinsonian severity in a rodent model." *Utah Biomedical Engineering Conference*, Jan. 2015.
174. Louie K, **Dorval AD**. "Neuronal information in an integrate-and-fire models." *Utah Biomedical Engineering Conference*, Jan. 2015.
175. Nesterovich D, Willsie AC, Butson CR, **Dorval AD**. "Towards the Implementation of a Novel DBS Electrode with Voltage-Steering Capability." *Utah Biomedical Engineering Conference*, Jan. 2015.
176. Polar-Cabrera CA, Gupta R, Lehmkuhle MJ, **Dorval AD**. "The loss of cortical beta power stationarity in the 6-OHDA rat model of parkinsonism." *Utah Biomedical Engineering Conference*, Jan. 2015.
177. Sheppard DT, Anderson CJ, **Dorval AD**. "Action-suppression deficits with deep brain stimulation in a parkinsonian rodent model." *Utah Biomedical Engineering Conference*, Jan. 2015.
178. Anderson CJ, **Dorval AD**. "Information theoretic metrics as biomarkers of Parkinson's disease symptom severity." *Utah Science, Technology and Advanced Research Confluence*, Nov. 2014.
179. Lambert KM, White JA, **Dorval AD**. "Pharmacological dissection of information transmission through the basal ganglia pathways that govern parkinsonian motor symptoms." *Utah Science, Technology and Advanced Research Confluence*, Nov. 2014.
180. Louie K, **Dorval AD**. "Measuring Neural Information." *Utah Science, Technology and Advanced Research Confluence*, Nov. 2014.
181. Polar-Cabrera CA, Gupta R, Lehmkuhle MJ, **Dorval AD**. "Beta and low gamma cortical waves as a function of movement speed in the 6-OHDA rat model of parkinsonism." *Utah Science, Technology and Advanced Research Confluence*, Nov. 2014.
182. Willsie AC, **Dorval AD**. "Electric field shaping in a novel deep brain stimulating electrode." *Utah Science, Technology and Advanced Research Confluence*, Nov. 2014.
183. Polar-Cabrera CA, **Dorval AD**. "Simultaneous recording and stimulation from a single electrode during DBS using an active feedback system." *Utah Biomedical Engineering Conference*, Sept. 2013.
184. Willsie AC, **Dorval AD**. "Charge Steering DBS Accommodates Non-Spherical Target Structures." *Utah Biomedical Engineering Conference*, Sept. 2013.
185. Anderson CJ, **Dorval AD**. "Exploring the mechanisms of action-suppression deficits correlated with deep brain stimulation." *Utah Biomedical Engineering Conference*, Sept. 2013.
186. Hayden B, **Dorval AD**. "The use of piezoelectric film sensors to capture and analyze obsessive compulsive disorder in rodents." *Utah BioMedical Engineering Senior Research Symposium*, Apr. 2013.
187. King NO, **Dorval AD**. "An examination of dysarthria in deep brain stimulation." *Utah BioMedical Engineering Senior Research Symposium*, Apr. 2013.
188. Park SW, **Dorval AD**. "Analyzing neuronal activity in efferent basal ganglia." *Utah BioMedical Engineering Senior Research Symposium*, Apr. 2013.
189. King NO, **Dorval AD**. "An examination of dysarthria in deep brain stimulation." *Utah Biomedical Engineering Conference*, Sept. 2012.
190. Park SW, **Dorval AD**. "Analyzing neuronal activity in efferent basal ganglia." *Utah Biomedical Engineering Conference*, Sept. 2012.
191. Polar-Cabrera CA, **Dorval AD**. "Simultaneous recording and stimulation from a single electrode during DBS using an active feedback system." *Utah Biomedical Engineering Conference*, Sept. 2012.
192. Schister S, **Dorval AD**. "Inducing plasticity in motor pathways." *Utah Biomedical Engineering Conference*, Sept. 2012.

193. Willsie AC, **Dorval AD**. "A novel electrode design for deep brain stimulation." *Utah Biomedical Engineering Conference*, Sept. 2012.
194. Anderson CJ, **Dorval AD**. "Computational modeling of the basal ganglia for the prediction of optogenetic therapies for parkinson's disease." *Utah Biomedical Engineering Conference*, Sept. 2011.
195. Polar-Cabrera CA, Frerk M, Lehmkuhle MJ, **Dorval AD**. "Real-time feedback controlled deep brain stimulation based on cortical beta rhythms using a 6-OHDA rat model." *Utah Biomedical Engineering Conference*, Sept. 2011.
196. Schister S, Schrock L, **Dorval AD**. "Magnetoencephalography for the study of the effects of deep brain stimulation in cortical processing of parkinson's disease patients." *Utah Biomedical Engineering Conference*, Sept. 2011.
197. Thompson W, **Dorval AD**. "Software development for time-frequency analysis of magnetic source data." *Utah Biomedical Engineering Senior Research Symposium*, Apr. 2011.
198. Anderson CJ, **Dorval AD**. "Computational modeling of the basal ganglia for the prediction of new deep brain stimulation therapies for Parkinson's disease." *Mountain West Biomedical Engineering Conference*, Sept. 2010.
199. Hayden B, **Dorval AD**. "The use of piezoelectric film sensors to capture and analyze obsessive compulsive disorder in rodents." *Mountain West Biomedical Engineering Conference*, Sept. 2010.
200. Thompson W, **Dorval AD**. "Software development for time-frequency analysis of magnetic source data." *Mountain West Biomedical Engineering Conference*, Sept. 2010.
201. Willsie AC, **Dorval AD**. "Frustrated total internal reflection for small animal behavioral assays." *Mountain West Biomedical Engineering Conference*, Sept. 2010.
202. Anderson CJ, **Dorval AD**. "Development of a basal ganglia model to predict better methods of deep brains stimulation for treatment of Parkinson's disease." *Mountain West Biomedical Engineering Conference*, Sept. 2009.
203. Willsie AC, **Dorval AD**. "Improving the insertion process of microwire arrays." *Mountain West Biomedical Engineering Conference*, Sept. 2009.